

NON-PUBLIC?: N
ACCESSION #: 8805050195
LICENSEE EVENT REPORT (LER)

FACILITY NAME: South Texas, Unit 1 PAGE: 1 of 4

DOCKET NUMBER: 05000498

TITLE: Reactor Trip and Safety Injection Due to Loss of Offsite Power Caused
By Personnel Error
EVENT DATE: 03/30/88 LER #: 88-026-00 REPORT DATE: 04/29/88

OPERATING MODE: 1 POWER LEVEL: 007

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Charles A. Ayala, Supervising Licensing Engineer
TELEPHONE #: 512-972-8628

COMPONENT FAILURE DESCRIPTION:
CAUSE: A

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: At approximately 2112 hours on March 30, 1988 with Unit 1 in mode 1 at 7% power, a partial loss of offsite power resulted in a reactor trip. A low-low compensated T-cold signal initiated a safety injection (ESF actuation) sequence. A Notification of Unusual Event was declared. All safety systems functioned normally and offsite power was restored at approximately 2202 hours on March 30, 1988. Loss of offsite power occurred due to personnel error by Plant Electricians who inadvertently tripped the switchyard supply breakers while they were investigating a previous Main Generator trip. A design inadequacy in the Excessive Cooldown Protection System resulted in a subsequent safety injection actuation. Corrective actions include incorporation of a case study of this event into training sessions for maintenance personnel and an evaluation of the Excessive Cooldown Protection System to prevent future unnecessary safety injection actuations.

(End of Abstract)

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DESCRIPTION OF OCCURRENCE:

At 2100 hours on March 30, 1988 with Unit 1 in mode 1 at 7% power, Plant Electricians were troubleshooting the Main Generator negative sequence relay circuits in order to determine the cause of a Main Generator trip which had occurred that morning. The troubleshooting activities consisted of injecting a secondary current signal from the shorting links of the Main Generator current transformers (CTs) one at a time to check the wiring to device 46/G1 (negative sequence relay). At 2112 hours, secondary current was injected into the CT circuitry. The current injection energized relay 61/G1 (generator circuit breaker pole failure relay) which in turn energized lockout relay 86BF/G1. This relay caused switchyard breakers Y510 and Y520 and the supply breakers to the 13.8 KV auxiliary busses 1F, 1G, 1H, 1J and standby bus 1F to open. Loss of power to standby bus 1F removed power from bus E1A which caused an 'A' train ESF actuation. Standby Diesel Generator 11 started and sequenced the loads onto bus E1A. Buses E1B and E1C remained energized from Standby Transformer 1. Loss of power to the rod control motor generator sets resulted in all control rods dropping into the reactor core; the reactor tripped due to the resultant 2 of 4 power range instrumentation high negative rate signals. The NRC was notified pursuant to 10CFR50.72 at 2115 hours.

At 2118 hours a low-low compensated T-cold safety injection signal initiated a safety injection actuation. Standby Diesel Generators 12 and 13 started and ran unloaded as busses E1B and E1C remained energized from Standby Transformer 1. Feedwater isolation and auxiliary feedwater actuation occurred. All safety injection actuation equipment functioned as required. A Notification of Unusual Event (NOUE) was declared at 2120 hours.

The generator relay troubleshooting instructions were rewritten to correct the detailed, step-by-step directions for the maintenance personnel. These instructions were independently reviewed by design engineering. Subsequent performance of the troubleshooting led to the discovery of wiring discrepancies (phase rotation) in the main generator current transformers (CTs) protection relay and metering circuits. These wiring discrepancies were the cause of the initial trip of the generator by the negative sequence relay. They were corrected prior to restart of the unit.

The NOUE was terminated at 2238 hours. At approximately 2246 hours, the normal plant electrical lineup was restored, and at 0051 hours Reactor Coolant Pump (RCP) 1A was started to recommence forced Reactor Coolant System (RCS) circulation.

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DESCRIPTION OF OCCURRENCE: (cont.)

Following a review of the event and identification of the immediate causes, the

requirements for plant restart were satisfied. The unit was restarted at 0603 hours on April 3, 1988.

The ensuing investigation of the causes for the partial loss of offsite power/reactor trip and safety injection actuation concluded the following:

1. The troubleshooting instructions that resulted in energizing relay 61/G1 and the subsequent partial loss of offsite power/reactor trip were incomplete due to a less than adequate review of the applicable drawings. The existence of relay 61/G1 was overlooked by the personnel who developed the troubleshooting instructions.
2. The low-low compensated T-cold safety injection signal resulted from a decrease in loop 1 cold leg temperature due to normal charging after the reactor trip. The low-low compensated T-cold feature was provided as a diverse means to mitigate the effects of a rapid cooldown due to a faulted steam generator. Although the signal initiated during this event resulted in an unnecessary plant response, it was not the intention of the design to result in a safety injection actuation under these circumstances.

CAUSE OF OCCURRENCE:

The root causes of this event were:

1. A personnel error in the failure to adequately review the relay circuits involved with the CT troubleshooting activities.
2. A design inadequacy in the low-low compensated T-cold feature (Excessive Cooldown Protection).

ANALYSIS OF EVENT:

The safety systems functioned as expected as a result of the partial loss of offsite power; the ESF actuation resulting from the safety injection signal also functioned as expected. As there were no releases of radioactive material from the unit and the plant functioned as designed to prevent such releases, there were no safety consequences to the general public due to this event.

The event was reportable pursuant to 10CFR50.73 (a)(2)(iv).

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CORRECTIVE ACTION:

The following corrective actions are being taken to prevent recurrence of the event:

1. Immediately following the event, all troubleshooting was stopped. A team of managers from Plant Operations, Maintenance and Engineering reviewed the event to evaluate the cause and the immediate corrective actions required for safe restart of the unit.
2. A case study of this event will be incorporated into training sessions for electrical and I & C personnel. Emphasis will be placed on the need to thoroughly review and understand the consequences of each step of troubleshooting instructions before proceeding. This training will be completed by May 20, 1988.
3. HL&P is working with Westinghouse to develop the necessary modifications to eliminate the unnecessary SI actuation caused by the Excessive Cooldown Protection. A request for NRC approval of the modifications is anticipated to be submitted in early May 1988.

ADDITIONAL INFORMATION:

No previous loss of offsite power due to troubleshooting by maintenance personnel has occurred at STPEGS.

ATTACHMENT # 1 TO ANO # 8805050195 PAGE: 1 of 2

The Light company
P.O. Box 1700 Houston, Texas 77001 (713) 228-9211
Houston Lighting & Power
April 29, 1988
ST-HL-AE-2634
File No.: G26
10CFR50.73

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

South Texas Project Electric Generating Station
Unit 1
Docket No. STN 50-498
Licensee Event Report 88-026 Regarding
Reactor Trip and Safety Injection
Due to Loss of Offsite Power Caused by Personnel Error

On March 30, 1988, Houston Lighting & Power (HL&P) notified the NRC

pursuant to 10CFR50.72 of a reportable event regarding a loss of offsite power and subsequent reactor trip and safety injection. The primary cause of this event was personnel error. The event did not have any effect on the health and safety of the public. In accordance with 10CFR50.73, HL&P submits the attached License Event Report (LER 88-026).

If you should have any questions on this matter, please contact Mr. C.A. Ayala at (512) 972-8628.

/s/ G. E. Vaughn
G. E. Vaughn
Vice President
Nuclear Plant Operations

GEV/BEM/cr
Attachment: Licensee Event Report 88-026
Regarding Reactor Trip and Safety
Injection Due to Loss of Offsite
Power Caused by Personnel Error.

ATTACHMENT # 1 TO ANO # 8805050195 PAGE: 2 of 2

Houston Lighting & Power Company

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File No.: G26
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cc:

Regional Administrator, Region IV Rufus S. Scott
Nuclear Regulatory Commission Associated General Counsel
611 Ryan Plaza Drive, Suite 1000 Houston Lighting & Power Company
Arlington, TX 76011 P. O. Box 1700
Houston, TX 77001
N. Prasad Kadambi, Project Manager
U. S. Nuclear Regulatory Commission INPO
1 White Flint North Records Center
11555 Rockville Pike 1100 Circle 75 Parkway
Rockville, MD 20859 Atlanta, Ga. 30339-3064

Dan R. Carpenter Dr. Joseph M. Hendrie
Senior Resident Inspector/Operations 50 Bellport Lane
c/o U. S. Nuclear Regulatory Commission Bellport, NY 11713
P. O. Box 910
Bay City, TX 77414

Don L. Garrison
Resident Inspector/Construction
c/o U. S. Nuclear Regulatory Commission
P. O. Box 910
Bay City, TX 77414

J. R. Newman, Esquire
Newman & Holtzinger, P.C.
1615 L Street, N.W.
Washington, DC 20036

R. L. Range/R. P. Verret
Central Power & Light Company
P. O. Box 2121
Corpus Christi, TX 78403

R. John Miner (2 copies)
Chief Operating Officer
City of Austin Electric Utility
721 Barton Springs Road
Austin, TX 78704

R. J. Costello/M. T. Hardt
City Public Service Board
P. O. Box 1771
San Antonio, TX 78296

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